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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,080	09/25/2003	Tan-Jen Chen	2003B095	6291
23455 7590 06/27/2007 EXXONMOBIL CHEMICAL COMPANY 5200 BAYWAY DRIVE P.O. BOX 2149 BAYTOWN, TX 77522-2149			EXAMINER SINGH, PREM C	
			ART UNIT 1764	PAPER NUMBER
			MAIL DATE 06/27/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/671,080	<b>Applicant(s)</b> CHEN ET AL.	
	<b>Examiner</b> Prem C. Singh	<b>Art Unit</b> 1764	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 May 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 19-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. Rejection of claim 51 under 35 U.S.C. 112, second paragraph is withdrawn.

### ***Claim Rejections - 35 USC § 102***

2. (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
3. Claims 19, 22-44, 46, 48, and 51 are rejected under 35 U.S.C. 102(b) as being anticipated by Swan III et al (US 2001/0042700 A1).
4. With Respect to claim 19, Swan discloses a process for producing light olefins such as propylene from a naphtha stream in a FCC process (See page 1, paragraph 0010). Swan also discloses, " More than one type of catalyst particle may be present in the catalyst. For example, individual catalyst particles may contain large pore zeolite, shape selective zeolite, and mixtures thereof." (See page 3, paragraph 0023). Swan further adds, "The zeolite may range in size from about 0.1 to 10 microns." (Page 3, paragraph 0026). Swan also gives a list of medium-pore shape selective zeolite species including MFI, MFS,.....ZSM-5, ZSM-12, ...FER, TON.....silicalite, silicalite-2, .....SAPO-11, ALPO....and TAPO (See page 3, paragraph 0029; page 3 and 4, paragraph 0030).

It can be seen that Swan uses a combination of medium-pore zeolites which are different from each other. Thus, one molecular sieve will inherently have pore size index of at least one channel smaller than the other similar to the Applicant's claim.

Since Swan is using a combination of zeolites as claimed by the Applicant, Swan process should inherently be recovering a higher propylene conversion as compared to either component used alone, similar to the Applicant's claim.

5. With respect to claims 22-24 and 33-35, Swan invention does not specifically mention the difference in pore size index of the two molecular sieves. Swan invention does not explicitly disclose that the molecular sieves have one- dimensional non-interconnecting and three dimensional interconnecting channels.

Swan invention discloses the method to determine the pore size of the molecular sieves (See page 3, paragraph 0024), but does not specifically mention individual pore size index of at least one channel of say, ZSM-5, (which the applicant selects as the first molecular sieve) and say, SAPO-11 (which the applicant selects as the second molecular sieve). Since the pore size index of these standard molecular sieves is an inherent property, it is expected that the pore size indices of the two molecular sieves of Swan invention must be similar to the Applicant's claim and also they must have one-dimensional non-interconnecting and three-dimensional interconnecting channels as claimed.

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6. With respect to claims 25-29 and 37-41, Swan invention discloses that the molecular sieves include for example, MFI, MFS, MEI, MTW, EUO, MTT, HEU, FER, and TON structure type zeolites. Non-limiting examples of such medium pore size zeolites include ZSM-5, ZSM-12, ZSM-22, ZSM-23, ZSM-34, ZSM-35, ZSM-38, ZSM-48, ZSM-50, silicalite, and silicalite 2 (See column 4, lines 11-18). Other suitable medium pore size zeolites include the silicoaluminophosphates (SAPO) such as SAPO-4 and SAPO-11, ALPO-11, TASO-45, TAPO-11 (See page 3 and 4 , paragraph 0029 and 0030).

7. With respect to claim 30, Swan discloses using cat naphtha and further discloses that cat naphtha contains olefins, aromatics, and paraffins (See page 2, paragraph 0012). However, Swan does not specifically disclose the percentage composition. Since naphtha used by Swan is a typical cat naphtha as claimed, it should inherently comprise paraffins and olefins in the claimed range

8. With respect to claim 31, Swan discloses a hydrocarbon residence time of 1 to 10 seconds, temperature from 450 to 650°C, hydrocarbon partial pressure from 10 to 40 psia, and catalyst to heavy feed (wt/wt) ratio from about 3 to 12, where catalyst weight is total weight of the catalyst composite (See page 2 and 3, paragraph 0021).

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9. With respect to claim 32, Swan discloses using a large pore zeolite (See page 3, paragraph 0023). Swan also discloses using a feedstock comprising hydrocarbon mixture with initial boiling point of 220°C (See page 2, paragraph 0013).

10. With respect to claims 36 and 42, Swan discloses large pore zeolites with pore diameter more than 0.7 nm as zeolite Y and mixtures of zeolite Y and beta (See page 3, paragraph 0026 and 0027).

11. With respect to claims 43, 44, and 48, Swan discloses using zeolite Y and mixture of Y and beta as the third molecular sieve (See page 3, paragraph 0026 and 0027).

12. With respect to claim 46, Swan discloses using, "Gas oils, heavy hydrocarbonaceous oils comprising materials boiling above 565°C, heavy and reduced petroleum crude oil, petroleum atmospheric distillation bottoms, petroleum vacuum distillation bottoms, pitch, asphalt, bitumen, other hydrocarbon residues, tar sand oils, shale oil, liquid products derived from coal liquefaction processes, and mixtures thereof." (Page 2, paragraph 0013).

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13. With respect to claim 51, Swan discloses, "There is an increased demand for FCC products containing increased concentration of light olefins that may be separated for use in polymerization." (Page 1, paragraph 0003).

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

17. Claims 20, 21, 45, 47, 49, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swan III et al (US 2001/0042700 A1).

18. With respect to claim 20, Swan discloses that the feed to the first reaction zone of the catalytic cracking process includes naphtha (final boiling point less than 190°C) (See page 2, paragraph 0012 and 0013).

19. With respect to claim 21, Swan discloses, "The medium pore size zeolites generally having a pore size from about 0.5-0.7 nm." (Page 3, paragraph 0029).

It is to be noted that Swan's disclosure per claims 20 and 21 show overlapping range of boiling point and pore size respectively. It is also to be noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. See *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

20. With respect to claim 45, Swan uses hydrocarbon oils boiling in the range of 220-565°C (See page 2, paragraph 0013).

Although Swan does not specifically mention the 50% point of the hydrocarbon oil, it will obviously be between the IBP and FBP, and one skilled in the art could easily



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determine. It is expected that the 50% point in Swan invention will also be close to the Applicant's claim.

21. With respect to claim 47, Swan discloses, "The zeolite portion of the catalyst particle will typically contain from about 5 to 95 wt % zeolite Y and the balance being ZSM-5." (Page 3, paragraph 0028). It is to be noted that Swan invention is using the disclosed percentage while using one large pore and one medium pore zeolite. Swan also discloses, as discussed earlier, use of a mixture of zeolites varying in the pore size from 0.1 to 10 microns (See page 3, paragraph 0023). Thus, it would have been obvious to one skilled in the art to use a weight ratio of three molecular sieves (one large pore and the other two with medium pore) to be effective for propylene production.

22. With respect to claims 49 and 50, Swan discloses in Table 3 (Page 7) propylene to be 13.3% and 10.7% butylenes (based on the total cracked product).

Swan's disclosure per claims 49 and 50 show overlapping range of propylene and butylenes percentage. It is to be noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. See *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

***Response to Arguments***

23. Applicant's arguments with respect to claims 19-51 have been considered but are moot in view of the new ground(s) of rejection.


***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prem C. Singh whose telephone number is 571-272-6381. The examiner can normally be reached on MF 7:00 AM-3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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